February 9, 2004

Ms. Terese Van Donsel
United States Environmental Protection Agency
Office of Superfund, Region 5
SR-6J
77 West Jackson
Chicago, IL 60604-3590

Subject: Fields Brook Superfund Site
Detrex Source Area-Ashtabula, Ohio
Docket No. V-W-98-C-450

Dear Ms. Van Donsel,

As discussed, attached are additional discussions, corresponding supportive data, and photographs, prepared by Detrex, as to our request for the EPA to consider a technical infeasibility for the practical recovery of DNAPL on the Detrex property.

If you have any questions, please contact me at (440) 997-6131, ext. 201.

Sincerely,

Thomas W. Steib
Operations Manager

cc: T. Mark, T. Doll, D. Church, R. Currie, K. Mast

MEMORANDUM OF DIFFICULTIES ENCOUNTERED
IN OPERATION OF THE DETREX CORPORATION
DNAPL RECOVERY SYSTEM

As the EPA knows, the Detrex DNAPL recovery system officially went on line in the month of October 2002. From the outset, the system was plagued with operational problems. The system was installed to work automatically but never has operated as intended.

The silt that was brought up with the DNAPL continuously plugged the valves that were installed, the diaphragm pumps needed continuous cleaning, the foot valves at the bottom of the wells were plugged with silt and never closed properly, the automatic solenoid valves plugged, and other plugging problems which rendered the process unusable as an automated process. One of the diaphragm pumps may be seen in the lower right portion of picture P205001.

The system had to be operated manually. This silt also had a negative effect on the settler. When the settler was designed, no one had any idea how much silt would be pumped along with the DNAPL. Since this is just an experimental design and implementation, no one had any thought that silt would not settle out of the DNAPL underground.

Due to the high density of the DNAPL, the fine particle size of the silt, and the added velocity of the DNAPL from the vacuum enhancement, no settling occurs underground but instead, the silt is pumped along with the DNAPL up to the settling tank. The tank was not designed to hold as much silt as was recovered.

The tank had to be cleaned often, which caused an air quality problem inside the building. Every time the settling tank was cleaned, it had to be opened up and drained. With the opening of the top lid, volatile portions of DNAPL evaporated and filled the building.

To help remedy the problem of silt entering the separator, 100 micron and 25 micron filters were installed ahead of the separator. A typical filter housing may be seen in picture PA170007 beneath the step ladder. Frequently, these filters plug up immediately due to the quantity of silt and crystals in the DNAPL.

This caused another problem of additional waste from the filters, the silt on the filters that were disposed of as hazardous waste, and inside a r quality problems from changing the filters. Once again, this filtration step would not allow us to operate the system automatically.

Two of the constituents of the DNAPL are crystals of hexachlorobenzene and hexachlorobutadiene (both of these to be called HBD). These crystals are much larger

in size than the silt and caused the air diaphragm pumps, the foot valves and the solenoid valves in the system to plug up. This is an ongoing problem and these crystals are ubiquitous throughout the DNAPL pool. Once again, this was an unexpected problem.

Crystals are also developed with the use of vacuum. As will be discussed below, vacuum is needed to bring the DNAPL to the well. Without vacuum, we are not able pump any DNAPL. On the other hand, using vacuum to retrieve DNAPL from the surrounding soil, causes crystals to form. These crystals cause plugging problems.

During the initial three months, some of the wells collapsed. To properly operate the wells, air pressure of about 5 psi is put on the wells. This air pressure blew away some of the sand pack around the wells. This permitted the air to short circuit the well and blow out of the surface of the ground. This may have contributed to the collapsing of several of the wells. This is an ongoing problem. Even with the longer sleeves around wells, we still get short-circuiting of the air and collapsing of wells. This collapsing of the wells caused us to shorten the wells so at least they would function. Obviously by shortening the wells, we reduce the yield of DNAPL since we are higher off the glacial till. Some wells collapsed so badly that we were forced to cap them rendering them useless.

Once we got through the original startup of the system in the fourth quarter of 2002, winter came. We were frozen from January 2003 until March. During this time, we began changing the solenoid valves to manual ball valves to eliminate plugging from silt and HBD. Further changing to air actuated ball valves may be seen in pictures P205001 and P205002. When we were able to pump, we continuously redeveloped the wells, continuously changed filters prior to the settling tank, and tried different amounts of vacuum to reduce the amount of silt, all to no avail.

The month of April was no different. We started to notice deformation of the well inserts. The cause of this well deformation was never positively determined. The separator was cleaned out several more times due to the silt and wells were redeveloped once again

In the month of May we discovered how big the silt problem was. Because we were not getting a good separation between the DNAPL and water, mainly because the silt causes an emulsion between the water and DNAPL that takes extensive time to break, we had an excursion of our NPDES. At that time, it was not known how long it took for the water/DNAPL emulsion to break. Unbeknownst to us, we were allowing DNAPL to get into our stormwater treatment system. This DNAPL saturated our carbon beds. Once the carbon beds were saturated, they did not remove the organics from our stormwater.

This excursion of our NPDES was organics in our discharge to Fields Brook. We immediately began the process of changing the separator to a 600 gallon round bottom stainless steel tank. This tank is shown in pictures PA170004 and PA170007. This

DNAPL/water emulsion caused by silt is a continuous problem that will never be remedied.

During the entire summer of 2003, we experienced the usual plugging problems from silt, crystals, and collapsing of the wells. We began programs of replacing the HDPE lines, which were sagging and enhancing our plugging problems, replacing the solenoid valves with ball valves, replacing the pump houses with bigger, better insulated buildings to prevent winter time freezing, and installing the 600 gallon separator tank.

The inside of the pump houses, the stainless steel lines, and new air actuated ball valves can be seen in pictures P2050001 and P2050002. The exterior of the north pump house looking east toward the HDPE DNAPL storage tank can be seen in picture P2050012.

In the months of September and October, we capped three of the 12 wells due to plugging and collapse. We installed sleeves on eight of the 12 wells with mixed success. Even on the wells with sleeves, we still had air short-circuiting. The 600 gallon separator tank was installed to give better separation of the water and DNAPL. The project of replacing the HDPE lines with stainless steel lines had begun. Two new pump houses were built to replace the smaller, less insulated pump houses. All of these improvements are shown in the pictures submitted. The wells were continuously being redeveloped due to excessive silt build up.

In the month of November, we continued on the installation of the pumphouses and stainless steel lines. We still had three of the wells capped and the sleeves on the other wells showed limited success. The separator tank's site glasses were beginning to get plugged with silt so that separation needed constant and careful watching to avoid another NPDES violation.

In the month of December, we capped an additional two wells to give us a total of five wells out of twelve capped and not functional. The silt problem will never go away since the silt needs a significant amount of time underground to separate from the DNAPL. Since we need vacuum assist to pump the DNAPL, there isn't enough time for the silt to separate from the DNAPL. On the other hand, the vacuum that is needed to move the DNAPL causes more crystals to form in the DNAPL.

The month of January 2004 saw the return of cold wintry weather. Since January 6, 2004, we have been completely frozen.

Where do we go from here? There are two thoughts. One is to change the current well design such as a bigger sand pack, lower the sleeves to about one foot from the glacial till, no foot valves, make a finer screen, etc. Obviously, all of these to prevent us from pumping silt will lower our yield of DNAPL and will not cure the problem of well collapsing, air short-circuiting, crystals, etc. We will never prevent the pumping of silt. If we install a filter fine enough to prevent silt, we will not be able to pump any DNAPL. We have tried operating the wells with no air pressure. When we try to pump

with no air pressure, we don't get any DNAPL. Air pressure is needed in the range of at least 5 psi or more to help lift the DNAPL to the surface. With this much air pressure, short-circuiting occurs.

We tried to pump DNAPL with no vacuum. When we don't apply vacuum, we don't get any DNAPL since the DNAPL will not move with enough velocity in the low permeable soil to an area where we can recover it with our wells. This low permeable soil is one of the contributors that prevent recontamination of Fields Brook by the DNAPL.

Because we increase the velocity of the DNAPL with the vacuum, the silt does not have time to settle out and is pumped to the surface with the DNAPL. As described before, this vacuum enhancement causes the formation of crystals in the DNAPL.

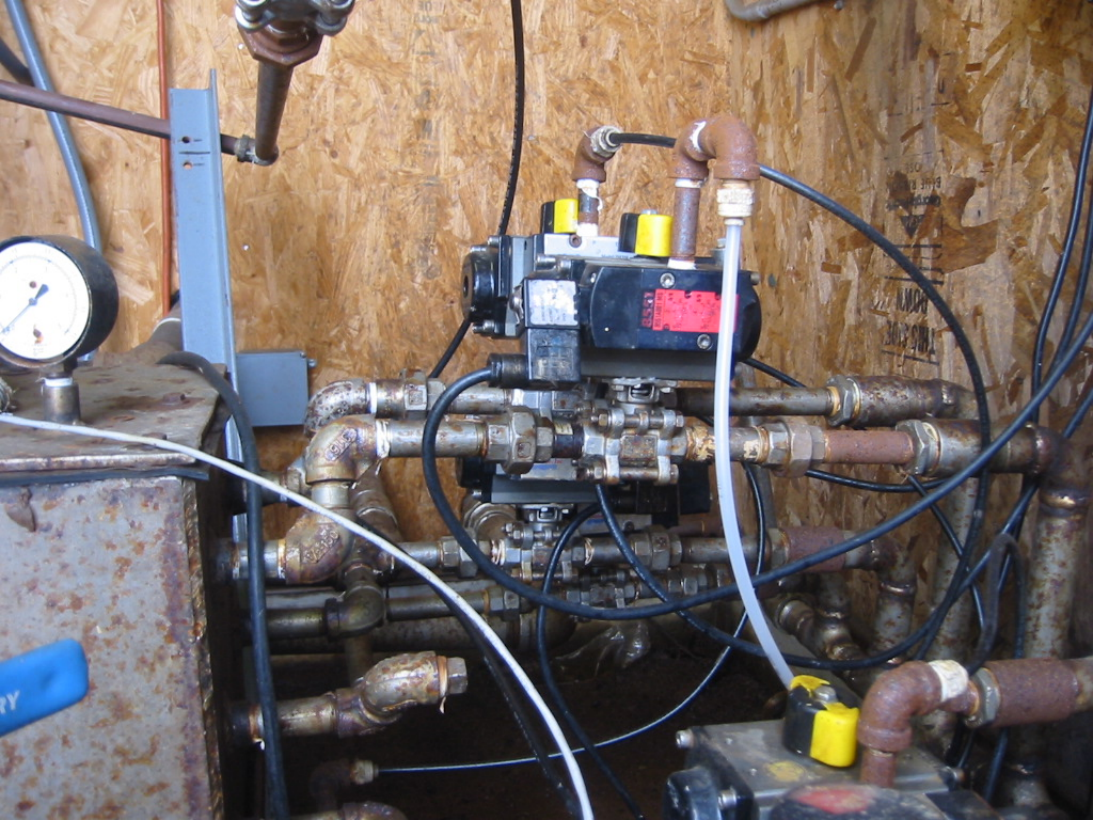
A second idea is to put an individual pump in each well. This poses the same problem as we currently have, silt and crystals plugging pumps and filters. The silt and crystals would cause pumps to plug and the pumps would need to be cleaned constantly. If filters were to be installed ahead of the pumps, the filters would clog instantly, as we have experienced in the past. Even 100 micron filters plug instantly when the silt load is of sufficient quantity.

Where we have wells that have a high concentration of crystals of HBD, the pumps would clog instantly and that well would essentially be a useless well. We could not pump any DNAPL from a well that has a high concentration of crystals. Therefore, URS and Detrex have concluded that there are no good solutions for making the DNAPL extraction system operate efficiently. We have tried every measure we can think of to "tweak" the system to operate in a better and more consistent manner. It is technically impractical to operate the system in its current design and there are no known system designs that would operate at any better level of efficiency. For these reasons, URS and Detrex respectfully request the EPA to consider a Technical Impracticability Waiver.

Table Detrex-1

DNAPL Recovery As Reported in Monthly Reports

Month	Water / DNAPL Pumped (in gallons)	DNAPL Recovered (in gallons)
Startup Phase October 2002 - February 2003	2411	220
March 2003	1462	381
April 2003	3087	404
May 2003	2752	1167
June 2003	3978	846
July 2003	3867	1382
August 2003	4277	558
September / October	3361	– * Operational difficulties and equipment replacement * System off-line from September 22 to October 6, 2003
November 2003	337	300
December 2003	1317	200
January 2004	207	116
February 2004	* Totalizer malfunctioned. No accurate way to measure total liquids pumped.	----
March 2004	* Totalizer repaired, but total volume pumped not recorded in monthly report.	240
Approximate TOTAL Volume of DNAPL		**5812**




WATER
WATER
DANGER